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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/508,527	07/17/2000	AKIKO ITAI	P19291	1282

7055 7590 10/01/2003

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EXAMINER
KIM, YOUNG J

ART UNIT	PAPER NUMBER
1637	

DATE MAILED: 10/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/508,527	ITAI, AKIKO	
	Examiner	Art Unit	
	Young J. Kim	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-10* is/are rejected.

7)☒ Claim(s) *3 and 5-7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☒ Interview Summary (PTO-413) Paper No(s). *19* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 10, 2003 has been entered.

Preliminary Remark

The Interview Summary of the telephonic interview which occurred on September 4, 2003 is attached hereto. Applicants need not draft a separate response to the Interview Summary so long as Applicants include a statement of the substance of the interview (MPEP 2281) in their response to the instant Office Action.

Claim Objections

Claims 3 and 5-7 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claims 3 and 5-7 are either a) directly dependent on claim 1; or b) indirectly dependent through claim 5.

Claim 1 has been amended to become drawn to a method of predicting a scaffold protein comprising a query sequence by employing segmentation of a reference protein into ***two or more segment sequences*** *comprising two or more continuous amino acid residues*. However, dependent claims 3 and 5-7 improperly broadens the scope of the claims by becoming drawn to a method employing segmentation of a reference protein into ***one or more segment sequences***. (Also see 37 CFR 1.75(g)).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 and its dependent claims 3-10 are indefinite for the recitation of the term, "continuous amino acid residues," because it is unclear how independent residue of amino acids can be continuous in form. For the purpose of prosecution, the term has been interpreted as " '*contiguous*' amino acid residues."

Claim 1 and its dependent claims 3-10 are indefinite for the recitation of the phrase, "reference proteins that has high similarity in three-dimensional structure to the protein comprising the query sequence" because it is unclear what criteria is used in determining the similarity step (i.e., sequence information or structural information). If the latter assumption is assumed, then it would appear that claim 1 is missing an essential element in how a 3-

dimensional structure of the query protein is determined (see MPEP 2172.01). For the purpose of prosecution, the former interpretation (i.e., sequence information) is assumed. Additionally, it is unclear what degree of sequence homology between the query protein and the reference protein would be considered "high." Applicants are requested to clarify this limitation by reference to the pages in specification.

Claim 7 is indefinite for the recitation of the phrase, "matching by sliding one or more core segment sequences on the query sequence," because it is unclear what is being "slid" against the query sequence, rendering the claims indefinite in its metes and bounds.

Claim 8 recites the limitation "the optimum matching." There is insufficient antecedent basis for this limitation in the claim. Additionally, the phrase, "calculated scores obtained from environmental information," is indefinite because it is unclear under what criteria the said scores were derived. For example, it is unclear whether the calculated scores are derived from the hydrophobicity/hydrophilicity or steric hindrances, etc.

Claim 10 is indefinite because it is unclear when the three-dimensional structure of query protein can be established. From perusing the claims, it appears that the three-dimensional structure of the query protein can only be established after its scaffold structure has been predicted (*i.e.,* after the method of claim 1 is finished).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 3-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Eisenberg et al. (U.S. Patent No. 5,436,850, issued July 25, 1995).

Claims 1 and 3-10 are drawn to a method of predicting the scaffolding of a protein (or backbone structure of a protein) via 3D-1D analysis.

3D-1D analysis is characterized by annotating the environmental information (such as hydrophobicity, hydrophilicity, degree of burial, etc.) of the amino acid residues of a protein of known structure (also called a reference protein) and matching a query protein sequence against the reference sequence, thereby identifying a region of homology, resulting in the prediction that the region of homology in the query protein has the same three dimensional structure to that of the reference protein.

Eisenberg et al. (hereto referred as '850 patent) disclose a method of determining the backbone structure of a query protein of unknown structure by comparing its sequence against a database of reference proteins with known structures and their environmental information (Abstract). The method disclosed by the '850 patent compares an environmental string (or information) of a query protein's residues against the environmental string of the predetermined proteins' residues stored in a database (column 4, lines 25-45; column 6, lines 43-65; column 10, lines 45-65). The method assigns various environmental classes for each residue of the template/query protein, such as buried core structure (hydrophobic) (column 4, lines 53-55), fraction of side chains covered by polar atoms (thus hydrophobic) (column 4, line55-56), and recites the degrees of burial of the residue (column 4, 57-65). The degree of burial is characterized as buried, partially buried, or exposed (lines 57-58). The '850 patent also

generates a 3-D structure profile for each of the environmental string of the proteins, creating a 3D-1D score (column 8, lines 27-36) and compares the query protein to the predetermined proteins in a database (column 10), resulting in a Z-score which expresses the degree of match (column 11, lines 42-45).

The '850 patent discloses that all sequences in a database of target sequences are aligned with the 3D structure profile using a dynamic programming, which allows insertions and deletions (or gaps) in the alignment (column 10).

The '850 patent does not explicitly disclose that the comparison of the sequences involve segmentation of the reference protein into two or more segments, wherein the segments comprise two or more continuous amino acid residues.

However, Eisenberg et al. (U.S. Patent No. 6,512,981 B1, issued January 28, 2003, priority May 1, 1997) disclose the ***inherent property*** of dynamic programming algorithm which '850 patent employs:

> "The "local" algorithm finds the highest-scoring aligned segment, allowing unpenalized-unaligned N- and C-termini both in the sequence and in the structure. The "global" alignment algorithm allows at most two unaligned termini without penalization, but requires that at least one N-terminus segment and one C-terminus segment of either the sequence or the structure be either aligned or penalized. The preferred embodiment uses a different variation, dubbed the "global-local" alignment. This algorithm does not penalize unmatched N- or C-termini segments in the probe sequence (local alignment), but does penalize any gaps in the target structure (global alignment). This variation produces more reliable scores than those obtained by the commonly used global or local

algorithms. See Fischer et al., "Assessing the performance of inverted protein folding methods by means of an extensive benchmark", Proc 1st Pacific Symposium on Biocomputing: 300-318..." (column 9, lines 40-55).

Since Eisenberg et al. ('850 patent) employs a dynamic programming for the practice of their method, the programming of which involves segmentation analysis of N and C termini segment, and the **inherency** of the dynamic programming disclosed by Eisenberg et al. ('981 patent), the invention as claimed is determined to be anticipated by Eisenberg et al. ('850 patent).

Conclusion

No claims are allowed.

Inquiries

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Young J. Kim whose telephone number is (703) 308-9348. The Examiner can normally be reached from 8:30 a.m. to 7:00 p.m. Monday through Thursday. If attempts to reach the Examiner by telephone are unsuccessful, the Primary Examiner in charge of the prosecution, Dr. Kenneth Horlick, can be reached at (703)-308-3905. If the attempts to reach the above Examiners are unsuccessful, the Examiner's supervisor, Gary Benzion, can be reached at (703) 308-1119. Papers related to this application may be submitted to Art Unit 1637 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1156 OG 61 (November 16, 1993) and 1157 OG 94 (December 28, 1993) (see 37 CFR 1.6(d)). NOTE: If applicant does submit a paper by FAX, the original copy should be retained by applicant or applicant's representative. NO DUPLICATE COPIES SHOULD BE SUBMITTED, so as to avoid the processing of duplicate papers in the Office. All official documents must be sent to the Official Tech Center Fax number: (703) 872-9306. For Unofficial documents, faxes can be sent directly to the Examiner at (703) 746-3172. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0196.

Young J. Kim

9/25/03

KENNETH R. HORLICK, PH.D
PRIMARY EXAMINER

9/29/03